type which is suitable to the local technical environment, including but not limited to semiconductor based memory devices, magnetic memory devices and systems, optical memory devices and systems, fixed memory, removable memory, disc memory, flash memory, DRAM, SRAM, EEPROM and the like. Various embodiments of the DP **202**, **222**, and **252** include but are not limited to general purpose computers, special purpose computers, microprocessors, digital signal processors (DSPs) and multi-core processors.

[0057] While various exemplary embodiments have been described above it should be appreciated that the practice of the invention is not limited to the exemplary embodiments shown and discussed here. Various modifications and adaptations to the foregoing exemplary embodiments of this invention may become apparent to those skilled in the relevant arts in view of the foregoing description.

[0058] Further, some of the various features of the above non-limiting embodiments may be used to advantage without the corresponding use of other described features.

[0059] The description herein should therefore be considered as merely illustrative of the principles, teachings and exemplary embodiments of this invention, and not in limitation thereof.

[0060] As similarly stated above PCI confusion may be due to the introduction of small sized cells. In a non-limiting example a typical cell size of HNB/HeNBs can be much smaller than macro cells, and there can be multiple HNBs/HeNBs within a coverage area of a source eNB that have the same PCI. This can lead to PCI confusion wherein the source eNB is unable to determine the correct target cell for handover from the PCI included in the measurement reports from the UE. The exemplary embodiments of the invention can be used to provide a solution to PCI confusion for any cell sizes including small sized cells.

[0061] In the present handovers are performed using a neighbor list and Automatic Neighbour Relation (ANR) procedures. FIG. **3**A illustrates FIG. **22.3.2***a*-**1** of 3GPP TS 36.300. FIG. **3**A illustrates an interaction between eNB and operations/maintenance (O&M) due to ANR. As shown in FIG. **3**A there is an NRT management function which receives instructions from the O&M to add/update neighbor relations. The NRT management function performs these operations using a neighbor removal function which received internal information, and a neighbor detection function which processes radio resource control management requests and reports. The NRT management function works to update a neighbor relation table or list. As shown in FIG. **3**A the ANR function resides in the eNB and manages the conceptual Neighbour Relation Table (NRT). Located within ANR, the Neighbour Detection Function finds new neighbours and adds them to the NRT. ANR also contains the Neighbour Removal Function which removes outdated NRs. The Neighbour Detection Function and the Neighbour Removal Function are implementation specific. An existing Neighbour cell Relation (NR) from a source cell to a target cell means that eNB controlling the source cell knows the ECGI/CGI and Physical Cell Identifier (PCI) of the target cell and has an entry in the NRT for the source cell identifying the target cell. For each cell that the eNB has, the eNB keeps a NRT. For each NR, the NRT contains the Target Cell Identifier (TCI), which identifies the target cell. For E-UTRAN, the TCI corresponds to the E-UTAN Cell Global Identifier (ECGI) and Physical Cell Identifier (PCI) of the target cell. The ANR function can rely on cells broadcasting their identity on global level, E-UTRAN Cell Global Identifier (ECGI) and allows O&M to manage the NRT. O&M can add and delete NRs. It can also change the attributes of the NRT. The O&M system is informed about changes in the NRT.

[0062] FIG. **3**B illustrates FIG. **22.3.3-1** of 3GPP TS 36.300. FIG. **3**B illustrates an Intra-LTE Automatic Neighbour Relation (ANR) function. As shown in FIG. **3** the eNB serving cell A has an ANR function. As a part of the normal call procedure, the eNB instructs each UE to perform measurements on neighbor cells. The eNB may use different policies for instructing the UE to do measurements, and when to report them to the eNB. When UE discovers a new ECGI, the UE reports the detected ECGI to the serving cell eNB. In addition the UE reports the tracking area code and all PLMN IDs that have been detected. The eNB adds this neighbour relation to NRT. As shown at step **1** of FIG. **3**B the UE sends a measurement report regarding cell B. This report contains Cell B's PCI but not the cell's ECGI. When the eNB receives a UE measurement report containing the PCI, the following sequence may be used. At step **2** the eNB instructs the UE, using the newly discovered PCI as parameter, to read the ECGI, the TAC and all available PLMN ID(s) of the related neighbor cell. To do so, the eNB may need to schedule appropriate idle periods to allow the UE to read the ECGI from the broadcast channel of the detected neighbor cell. At step **3** of FIG. **3**B, when the UE has found out the new cell's ECGI, the UE reports the detected ECGI to the serving cell eNB. In addition the UE reports the tracking area code and all PLMN IDs that have been detected. If the detected cell is a CSG or hybrid cell, the UE also reports the CSG ID to the serving cell eNB. Then at step **4** the eNB decides to add this neighbor relation, and can use PCI and ECGI to update the Neighbor Relation List. It is noted that the eNB may differentiate an open access HeNB from the other types of (H)eNB by the PCI configuration or ECGI configuration.

[0063] It is noted that most of these ANR operations of FIG. **3**B which can result from PCI confusion can be avoided using the method in accordance with the exemplary embodiments of the invention as described herein.

[0064] In general for a handover a UE reports the PCI of the target cell and the eNB uses the neighbor Relation List or NRT which is the mapping between PCI and target cell (ECGI) to find the matching target cell for the handover. It is noted that the terms neighbor relation list may be used herein in the description to refer to the NRT, or vice versa. The PCI serves as a primary identifier for handover procedures. During mobility when neighboring cells measurements are performed by the UE, the UE reports a radio measurement for each PCI it can see. The eNB uses the PCI to map to the matching neighboring cell (EGCI). In order to allow successful handovers, the PCI allocation in a neighborhood has to fulfill the condition of confusion-free (i.e.) each neighboring ECGI should have a unique PCI value assigned. Thus, duplicate entries for the same PCI would cause PCI confusion and be problematic for at least a neighbor list PCI mapping as described above. The Operator would be required to resolve the PCI confusions to uniquely identify the neighboring cells such that handovers will be successful. In the present standards to perform handover when PCI confusion exists it is required that the eNB perform a ReportCGI procedure (ANR) to resolve the ambiguity detected in the neighbor list. Following are some of the disadvantages of this method:

[0065] handover execution is delayed, thus there is a potential of radio loss of the UE;